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FROMONDUS AND HIS NOTES ON THE WEATHER.

A RECENT number of *Ciel et Terre* contains the only modern notice which we remember to have seen of Professor Libert Froidmont, of Louvain.* The article, like nearly all those which appear in our Belgian contemporary, is well worth reading, but there are one or two points upon which the author (Prof. Monchamp) may be glad of a little information, and possibly by drawing attention to the article here, still further particulars may be forthcoming.

Prof. Monchamp regards the record of the weather kept by Froidmont in 1614 and in 1625 as "the earliest kept in Belgium, if not in the world." Has he forgotten "Tyge Brahe's Meteorologiske Dagbog, holdt paa Uraniborg for Aarene 1582—1597"?

Everybody did not secure a copy of Merle's MS., so it may be well to give wider circulation to a specimen month, nearly 300 years earlier than Froidmont:—

Record of the Weather at Driby, Lincolnshire, by the Rev. W. Merle, A.D. 1343.

March 1.—Frost, with little snow, and afterwards light rain.
,, 2.—Slight fog.
,, 3 & 4.—Slight frost, with little hoar-frost.
,, 5.—Light rain, with N.W. wind.
,, 6 & 7.—Very strong S.W. wind.
,, 9.—Very strong S.W. wind, with rain.
,, 13.—Very strong S.E. wind, with rain.
,, 15.—Little hoar-frost, with strong W. wind.
,, 16.—Strong W. wind in the night.
,, 17.—Very strong W. wind, with rain.
,, 19.—Very strong W. wind, with light rain.
,, 20.—Little hoar-frost, with little ice.
,, 21.—Little hoar-frost.

* Libertus Fromondus was Dr. of Theology, and Prof. of Philosophy and Theology in the University of Louvain. He was born on the 3rd (or 6th) of September, 1587, at Hackör on the Maas (Haccourt, near Liège, Belgium), and died at Louvain, near Brussels, October 27th, 1653.

March 25 & 26.—Stormy, that is to say, very strong N.W. wind, with cold and with hail, rain, and snow many times in the day.

,, 27.—Slight hoar-frost, with N.W. wind, before mid-day; after mid-day, serenity without wind, followed by light rain, with light thunder once.

,, 28.—Stormy, with very strong N.W. wind, and with hail, rain and snow very often in the day. At mid-day there was an earthquake, which was so great that, in certain parts of Lyndesay, stones in the chimneys fell down, after shaking in very great agitation, and it lasted long enough for the "Salutatio angelica" to be said distinctly.

,, 29.—Stormy, with hail, snow, frost, rain and N.W. wind.

,, 30.—Severer frost than on the 29th, with snow and wind.

,, 31.—Heavier snowfall than on the 30th, with N.W. wind, and there was a good deal of snow then.

The aforementioned earthquake was not felt at Oxford.

We shall be glad of information as to editions of Froidmont's book. We have the first five of the following six; are there any others?

FROMONDI, LIBERTI. Meteorologicorum libri sex.

			Size of Type.
A	4to.	Ex Officina Plantiniana, Antverpiæ 1627, xii.-438 pp.	7·1in. × 4·3in.
B	sm. 8vo.	Guilielmus Turner, Oxoniæ, 1639, xiv.-527 pp. ...	4·9 ,, × 2·7 ,,
C	4to.	Hieronymi Nempæi, Lovanii 1646, xii.-591 pp. ...	6·9 ,, × 4·3 ,,
D	sm. 8vo.	Ed. Story, Londini, 1656, xiv.-527 pp.	4·9 ,, × 2·6 ,,
E	sm. 8vo.	J. Redmayne, Londini, 1670, viii.-464 pp.	5·4 ,, × 3·2 ,,
F	4to.	... ... Londini, 1670...	

Prof. Monchamp quotes only editions A and C, and a London edition of 1655, of which we can trace no other copy. Is it a mistake? or was D issued in 1655 as well as in 1656? It will be noticed that, besides giving what we believe to be the forms (4to, 8vo, &c.) of each volume, we give the length and breadth of a full page of type—*i. e.*, without head-lines or marginal notes. We have long regarded the 4to, 8vo, &c., as confusing, and are glad to quote the following authority against them :—"At the recent International Congress of Publishers in Paris the inexactness of designating the size of books as 4to, 8vo, and 12mo, was discussed, and a resolution was passed to the effect that publishers' catalogues should give the actual sizes of volumes, in the metric system."—*Science*, July 23rd, 1897.

De La Lande in his *Bibliographie Astronomique* calls edition B 12mo. D is once described as 12mo, but generally as an 8vo, though the dimensions are very small for that, and E is described by one authority as 8vo, and by another as 18mo!

We think that one sentence in Prof. Monchamp's interesting note is incorrect, but as the Editors have passed it, we are almost afraid

to criticize. However, we venture on reprinting it, and putting in italics the statement to which we object.

"Il cite (p. 79) un témoin digne de foi qui, au milieu d'une nuit de l'automne de 1625, a vu une longue traînée lumineuse partir de l'occident, s'élever jusqu'au zénith, et faire pâlir la Lune, qui pourtant brillait alors de tout son éclat. *Il s'agit sans doute ici de la lumière zodiacale.*"

Surely the zodiacal light never shone at midnight brightly enough to dim the light of the moon. Would not the passage of a bright meteor accord better with the statement?

Prof. Monchamp gives a diagram of the winds according to Froidmont, which we commend to the attention of Mr. J. G. Wood, in case he should feel inclined to carry further the interesting consideration of the subject which he gave in Theophrastus.

We agree with Prof. Monchamp in his concluding paragraph, which may be freely paraphrased as follows:—

In finishing my little paper, I would advise those interested in Meteorology to read the whole of Fromondus's book. Meteorology has, of course, made great progress in nearly 300 years, but all the theories and facts are not to be despised; even the errors are useful, they show us the road travelled, and the pits to be avoided, they should render us cautious both as to our theories and our facts, if we wish to be respected when another 300 years have passed.

RECENT STORM RAINS.

IN two consecutive numbers we have had to deal with hail of quite exceptional size, falling during the storms in Sussex and Essex, and now we have some equally remarkable rainfall records.

July 20th.

OXFORD.

St. Giles', Oxford.—TS from 3.45 to 5 p.m. and 1·30 in. of R, 1·14 in. falling by 4.45 p.m.—E. M. TAWNEY.

The fall at *Magdalen College* was 0·83 in., and at the *Radcliffe Observatory* 1·66 in.

DEVON.

Water Works, Torquay.—On July 20th we had a very heavy fall of rain on our watershed, viz., 3·02 in. at Tottiford, and 1·40 in. at Kennick. Of the 3·02 in. at Tottiford, 2·75 in. fell in 70 minutes, and at the same time there was a heavy fall of hail, some of the stones being quite an inch across. A large amount of soil was washed into our reservoirs, and no less than 186 cubic yards found its way into the Intake. The storm appeared to have its centre between the village of Lustleigh and our reservoirs, and the roads suffered severely.—W. INGHAM, A.M.I.C.E.

GLOUCESTER.

Upfield, Stroud.—Very severe TS from 4.30 to 5.30 p.m. R in that hour 1·62 in., and 0·33 in. more in the following two hours. Within a mile of here a tree, a brick wall and a brick chimney stack were struck, and a sheep was killed by L.—ROSE E. STANTON.

Further Barton, Cirencester.—Three heavy TSS took place: The first at noon, over in about an hour, when ·27 in. of R fell. The second began with T in the S.W. before 2.30 p.m.; at 3 p.m. two trees were struck by L about half-a-mile distant; the storm passed round to the E. The third came up also from the S.W.; R and H began at 5 p.m.; two violent claps of T, instantaneous with the L, at 5.15 p.m. and 5.30 p.m., when a Scotch fir had a strip of bark peeled off from top to bottom. The H stones caused great damage to apples and all vegetation; they were chiefly round, some with sharp points, but not pyramidal. Bar. steady; no wind. Total R 1·43 in.—E. BROWN.

NORTHUMBERLAND.

Pawston, Coldstream.—R 2·13 in., the heaviest fall in 24 hours since September, 1880. In the three days 19th to 21st, 3·10 in. fell, practically all in 48 hours.

July 21st.

MIDDLESEX.

Fairfield Road, Crouch End.—Severe TS, with heavy R and H the size of large peas or small marbles. Between 2.15 p.m. and 4.15 p.m. 1·90 in. of R fell, and in the 24 hours 2·09 in. Water found its way into the basements of houses where it had never been seen since they were built in 1887.—H. SOWERBY WALLIS.

Aubrey Road, Crouch End.—During the heavy TS here this afternoon exactly 2·00 in. of R fell (between 2 and 5 p.m.), the heaviest R being between 3 and 4.—W. B. BUTLER.

Finsbury Park.—Between 1.15 and 3.45 p.m. there fell 2·10 in. of R, of which, probably, two inches fell between 1.30 and 3.30 p.m. Between 3.45 and 5.30 p.m. there was a further fall of 0·43 in., making the total in less than four hours 2·53 in. At *Lordship Road, Stoke Newington*, in the same time there fell only 1·68 in.—EDMUND L. MORRIS, A.M.I.C.E.

Cazenove Road, Stoke Newington.—After the storm, my rain gauge recorded 3·18 in. For at least ten years no such amount has been measured in North London.—E. J. BENTLEY.

Camden Square is within three miles of all these stations, but the fall there was only 0·01 in.

BERKS.

The Elms, Faringdon.—Heavy TS, 0.30 to 1.25 p.m., in which time the R was 1·20 in. At Coleshill (Wilts), three miles off, there was no R.—W. DUNDAS.

BUCKS.

Addington, Winslow.—TS, a cow and a sheep killed. R ·73 in.—J. MATHISON.

SUFFOLK.

Bishop's Hill, Ipswich.—Violent TS, and the heaviest R I have ever seen; in one hour, between 4.15 and 5.15 p.m., there fell 2·95 in. In the first half hour the fall must have been at the rate of five or six inches an hour.—G. A. BIDDELL, M.I.C.E.

Clare Lodge, Ipswich.—Total R = 1·86 in.—E. R. TURNER, M.I.C.E.

Museum, Ipswich.—Total R 2·05 in.—FRANK WOOLNOUGH.

Nova Scotia House, Ipswich.—The TS began at 4 p.m. Noticing that the R was excessive, I went to my gauge (which holds about 2⅓ inches) at 4.30 p.m., expecting to find an inch or an inch and a half, but the bottle was nearly full, 2·20 in., which I poured away; at 5 p.m. I went again and measured 2·00 in.; at 6.30 p.m., when the storm was over, there was a further 0·82 in., so that there was 4·20 in. in an hour, and 5·02 in 2½ hours. There was much flooding, and some damage. I think that the centre must have been near here. One man declares that he saw a waterspout within 100 yards of this house. In another part of the town two boys and a pony were killed by the L.—G. F. GOWER.

HEREFORD.

Bodenham, Leominster.—R between noon and 2.30 p.m. 1·61 in.—H. C. STURGES.

July 24th.

PERTH.

Coupar Angus Station.—Severe TS; a house was struck by L and the chimney top demolished. R ·49 in.

GALWAY.

Queen's College, Galway.—Great TS, with 1·21 in. of R.

July 26th.

HERTS.

The Lawns, Southgate.—In less than an hour-and-a-half, 2·50 in. of R fell in a TS; the R commencing about 4.55 p.m. and lasting till about 6.20 p.m. A good sized oak tree about 3 ft. in circumference and about 40 yards from the house was struck by L and split from top to bottom, the bark being peeled completely off.—G. A. CHURCH.

SOME OLD STORMS.

1557.

"IN *Stow's Annals* is the following narration of a remarkable storm. . ." "On Sunday, 14th of August, 1557, between the hours of 9 and 10 o'clock in the forenoon, whilst the minister was

reading the second lesson in the parish church of Blythburg,* a town in Suffolk, a strange and terrible tempest of Lightening and Thunder struck through the wall of the same church into the ground, almost a yard deep; drove down all the people on that side of the church, above 20 persons; then renting the wall up to the Revestry, left the door, and returned to the steeple, rent the timber, brake the chains, and fled towards Bungay. The people that were stricken down were found grovelling more than half an hour after, whereof a man and a boy were found dead; the others were scorched."—*Suckling's Antiquities of Suffolk.*

1741, 1745.

The Rev. Laurence Sterne was Vicar of Sutton-on-the-Forest, eight miles north of York. The following entries in the parish register are signed by him:—

1741. Hail fell in the midst of summer as big as a Pidgeon's egg. W^ch^ unusual circumstance I thought fit to attest under my hand.—L. STERNE.

1745, May. A dismal storm of hail fell upon this Town, and some other adjacent ones wh^ch^ did considerable damage to the Windows and Corn. Many of the stones measured six inches in circumference. It broke almost all the south and west Windows of this House and my Vicarage House at Stillington [2 miles further N.]—L. STERNE.

WHIRLWINDS ON JUNE 30TH AND JULY 16TH.

HAY CARRIED AWAY AT NETHER PRIORS, HALSTEAD, N. ESSEX.

TRULY Essex is a wonderful county. Mr. Joseph Last, haybinder, of Halstead, sent information to the branch office of the *Essex County Chronicle* in that town on Wednesday, June 30th, respecting a whirlwind that took place in the hayfield at Nether Priors about noon. The writer stated that a large quantity of hay was taken up into the air and carried out of sight. Twelve men who were at work in the field watched the travelling of the hay in great amazement.

The next note shows where it fell, about three miles further North.

A SHOWER OF HAY AT BELCHAMP ST. PAUL, N. ESSEX.

About eleven o'clock on Wednesday morning a curious phenomenon was witnessed in this neighbourhood. For some minutes the atmosphere was laden with falling hay. Trees, shrubs, houses, all secured a fair portion of well-made meadow hay, which came down

* A village 4½ miles S.E. of Halesworth.

in a very fantastic manner, some quite large bunches being among the single bents. It is supposed to be the effect of a whirlwind on a distant hay field.

A SHOWER OF FROGS IN BIRMINGHAM.

During a storm that raged with considerable fury in Birmingham on Wednesday morning, June 30th, a shower of frogs fell in the suburb of Moseley. They were found scattered about several gardens. Almost white in colour, they had evidently been absorbed in a small waterspout that was driven over Birmingham by the tempest.

WHIRLWIND NEAR HEREFORD.

The haymakers in Mr. Hewitt's meadow at Hampton Park, Friday, July 16th, shortly after noon, were somewhat startled to see a number of the "cocks" suddenly collected together and carried straight up in the air. The cause of this rather unusual scene was a whirlwind. The hay was, after its ærial flight, scattered in all directions, and some fell at a distance away of quite a hundred yards.

OBJECTIONS TO MOUNTAIN OBSERVATORIES.

AN American scientific paper argues that there are many objections to mountain stations. It says that the cost of building is very large. M. Vallot's Observatory on the flanks of Mont Blanc (14,321 feet) cost £15 a cubic meter. The cost of M. Janssen's small observatory building on the summit (15,781 feet) is said to have been £12,000. Again, such establishments are very expensive to maintain. Transportation to the summit of Mont Blanc costs about two shillings per pound, for example. There are difficulties in arranging for an adequate food and water supply (though melted snow is always available on the higher peaks). In the United States (owing to the deplorable policy in the matter of forest conservation) bush fires, which fill the air with haze, are very troublesome. On the highest peaks snow blindness is a constant danger. Mountain sickness (giddiness, nausea, great discomfort, and disorder) is almost always felt. The experiments of Mr. Whymper and others, in the high Andes and elsewhere, show that long residence at high levels may enable one to resist acute attacks of mountain sickness, but no amount of habitude, apparently, can counteract the "diminished living" which results from an insufficient supply of air for breathing. Observers at extreme altitudes must always be subjected to great discomfort, and their abilities must be correspondingly decreased. De Saussure, in his expedition to Mont Blanc, remarks that he required four-and-a-half hours on the mountain to perform experiments which took less than three hours in the valley. Here we have something like a numerical measure of the falling off in ability due to great altitude.—*Manchester City News*, Aug. 7th.

METEOROLOGY IN SCHOOLS.*

WEATHER forecasting has become a branch of study in many American schools, but especially in Boston. About 400 schools in New England now receive the daily weather maps from the U.S. Meteorological Bureau, showing the atmospheric conditions prevailing all over the country. These, as interpreted by the teachers, enable the pupils to comprehend the various factors which enter into the weather forecast. It is contended that this not only adds to an interest in natural phenomena, but is a practical introduction to scientific habits of observation. Of course, it involves instruction in the proper use of thermometers, barometers, and other instruments. Prizes for the best work in this branch of study have been offered in the New England lower schools.—*Tit-Bits*, Aug. 14th, 1897.

[Perhaps in the course of the next century even grown-up persons will have learned enough meteorology to know that it is better to get wet through in a thunderstorm, than to shelter under a tree. Even that does not seem to be generally taught yet.—ED. *M.M.*]

FLOODS IN SOUTHERN EUROPE.

DESCRIBING a perilous railway journey through the Austrian Tyrol after the rain had been falling continuously for four days, a correspondent writes :—Selecting the Innsbruck route, we reached Admont at ten in the morning, five hours late. Gangs of workmen accompanied the train, and were frequently employed removing landslips or repairing the lines, which in many places had been torn away by the raging torrent. At Admont I received the dismal news that we could proceed no further, and after waiting seven hours for instructions from headquarters, we learned that the train must return to Amstetten and proceed viâ Salzburg. All the passengers feared this retrograde journey, for the waters were still rising and the danger had manifestly increased. We had travelled a few miles only on the return road when our anticipations were realised, for a bridge, a structure of four or five arches, spanning the river and connecting a village near Hieflau, had been washed away since we had passed that morning. The scene in the corridor train itself was amusing and grotesque, for passenges of many countries and different tongues were vehemently making themselves understood by frantic gesticulations. We proceeded at a slow pace for several miles, drenched workmen walking in front of the engine, examining the permanent way. One bridge collapsed immediately our train had crossed over it. As we approached Amstetten the state of things was everywhere deplorable. Houses had been washed away and whole villages submerged. It was harvesting time, but there was no harvest. Through tracts of the most charming and fertile country, hundreds of miles in extent, the crops are entirely gone. We steamed into Amstetten Station about eight o'clock on Friday night; so, after twenty-three hours' anxious travel, we had actually accomplished a distance ordinarily covered in two or three hours from Vienna. Bridges had collapsed on the Salzburg and Munich route. The Linz

* See *Met. Mag.*, xxxi., p. 151.

line was flooded and in places washed away. Communication with Vienna was cut off, a railway bridge, with a passenger train, having fallen into the river at St. Polten. So Amstetten had become a veritable place of refuge. Several trains by various routes had returned to this village of some 2,000 or 3,000 inhabitants. For a dismal picture I can recall nothing to equal the sights at this station. Outside it was still raining in torrents. The hotels were full to their utmost capacity. Hundreds of weary and disappointed passengers, of all nationalities, and many families with children, could get no accommodation. Fortunately, a Continental station, with its café and restaurant, is better equipped to deal with such an emergency than would be the case at a wayside station in England. Several benevolent residents did yeoman service in finding rooms and beds for the stranded travellers. Amstetten is a very hospitable place, and it is pleasant to record that this band of gentlemen, to their own credit and to the honour of their town, rendered such acceptable assistance. By far the larger number of wayfarers found shelter for the night in the railway carriages, which the company placed at their disposal. Telegraphic communication was interrupted, and the following day (Saturday) railway traffic was suspended. Newspapers were not obtainable. The only news had its source in the local telephone office. Vienna itself was reported in danger, for the Danube in the preceding twenty-four hours had risen 12 ft. and was still rising. Such a mighty flood had it become that two miles from the bed of the river people were on the roofs of their dwellings, appealing for help, and the fortunate ones being rescued in boats. What I have witnessed along the course of one tributary of the Danube, was taking place in every valley in the Austrian Tyrol, and in Saxony and Bohemia the Elbe and its tributaries were making similar havoc.—*Daily Telegraph*, August 11th.

With reference to the above we hope to give some statistics in our next number, for we hear from Dr. Hellmann that he is preparing an account of the tremendous rainfall in Silesia, Saxony, Bohemia, &c., at the end of July. Some of the stations seem to have had about *twelve inches in four days.*

The only station in the neighbourhood of which particulars are given in the *Daily Weather Report* is Munich, where the mean annual rainfall is about 35 inches; the daily fall reported thence was—

	July 26th.	27th.	28th.	29th.	30th.	Total.
	in.	in.	in.	in.	in.	in.
Amount.....	0·35	1·22	0·47	0·75	1·42	4·21

REVIEWS.

The Story of the Earth's Atmosphere. By DOUGLAS ARCHIBALD, M.A., F.R.Met.Soc. London, 1897. Sm. 8vo.

ALTHOUGH the publishers (George Newnes, Limited) have not done us the honour of recognising our existence by sending us a copy of this work for review, we present them with one, because we think that our readers ought to know of this little book, which is very much better than either its title or its appearance suggests.

The author is one of the few who, while capable as mathematicians, will condescend, *and are able*, to convey to ordinary mortals the results arrived at by high class research. To all who wish to know the latest opinions as to why various atmospheric phenomena occur we strongly recommend this little book. In one respect it is, we think, unique—there are 208 pages by Douglas Archibald, and we have not seen a single mathematical expression; we do not think that there is even a + or a − in the whole book.

We have noticed very few slips; on page 38 probably Mr. Archibald is referring to something unknown to us, otherwise we think that "actinometer" should be "bolometer," and "Washington" should be "Mount Whitney." On page 134 he gives a new spelling of "Chirapunji;" it used to be Cherra Poongee; in 1864 Keith Johnston, in *Index Geographicus*, gave Chirra Punji *or* Chirra Poonjee; then in 1882 Mr. J. Eliot spelled it Cherrapunji; in 1890 Mr. Blanford gave Cherra Poonjee.

Illustrative Cloud Forms for the guidance of observers in the classification of clouds. Issued by the Hydrographic Office, Washington, U.S.A.; oblong, text 7 in. × 4 in., 16 coloured plates, 1897.

WE are not sure that it is desirable that there should be several cloud atlases in existence concurrently; but, probably, administrative difficulties would be raised if in any country copies of the *International Cloud Atlas* were purchased sufficient in number to supply an entire navy. This, probably, is the reason for the appearance of the present artistic little volume.

The Hydrographer (Captain Sigsbee, U.S.N.) in an introductory note points out that the classification, nomenclature and descriptive text are from the *International Cloud Atlas*, but everything else is American. The excellent colour lithography has been done by Messrs. L. Prang and Co. of Boston, and their representative worked in consultation with Mr. Cronan, who painted the cloud pictures which have been reproduced. Mr. Cronan had the further advantage of working from the I.C.A., from a collection of photos and other representations, and with the advice of Mr. Lawrence Rotch, Capt. Sigsbee and Mr. H. H. Clayton.

The result is a very handy little book, which satisfactorily meets its presumed object; some of the plates (vii., x., xi. and xiii.) are

excellent We do not say that iii. is incorrect, but it seems to us to have too much of the horizontal element in it, and we think that Mr. Cronan has not, in the mammato-cumulus, xiv., quite caught the idea of weight nearly breaking through a textile material (say, sand breaking through sacking) which is the characteristic of a perfect specimen of this cloud. Fig. 26 in the *International Cloud Atlas* is better in that respect, but it indicates rather too much separation—independence—between each mamma. Notwithstanding the extreme roughness of its execution, we think that the little woodcut in Dr. Clouston's *Explanation of the Popular Weather Prognostics of Scotland*, 1867, is more truthful and suggestive than either of its more costly successors.

THE INDEX TO THE "METEOROLOGICAL MAGAZINE."

WE see that it was in our number for March, 1896, that we promised to compile the above; but it was a heavy task, and it was only in July, 1897, that it was finished and the copies were completed, bound and sent to the subscribers.

As we anticipated, the subscription price of 2s. 6d. proved far too little; but as Mr. C. L. Brook (whose letter will be found on p. 24 of our last volume) has sent the very handsome contribution of £10 towards the cost, and, as we hope that a reasonable number of copies will be sold at the full price of 5s., we do not think that there will be any serious loss.

As stated in the Preface, we are greatly indebted to the Rev. T. A. Preston for his help; and, though the Index like most human things is not absolutely perfect, we are glad to hear from many quarters satisfactory assurances of its utility.

ERRATA IN "METEOROLOGICAL MAGAZINE," 1896.

REGULAR TABLES.

Waringstown	February.	Total	rain	*should be*	1·46	in.	*not*	1·26	in.
Cargen [Dumfries].....	March.	,,	,,	,,	,,	4·65	,,	,,	4·56	,,
Stroud, Upfield	April.	,,	,,	,,	,,	1·06	,,	,,	1·11	,,
Omagh, Edenfel.....	,,	,,	,,	,,	,,	2·42	,,	,,	2·52	,,

SUPPLEMENTARY TABLES.

Rendlesham Hall	January.	Total	rain	*should be*	1·30	in.	*not*	1·24	in.
Northampton, Sedgebrook	March.	,,	,,	,,	,,	2·79	,,	,,	2·70	,,
Colchester, Lexden.....	,,	,,	,,	,,	,,	2·80	,,	,,	2·77	,,
Lough Swilly, Carrablagh	April.	,,	,,	,,	,,	2·93	,,	,,	2·87	,,
Killybegs	August.	,,	,,	,,	,,	4·32	,,	,,	4·27	,,
Lilliesleaf, Riddell	November.	,,	,,	,,	,,	1·04	,,	,,	1·14	,,

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, FEBRUARY, 1897.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Absolute. Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
England, London	58·0	26	27·9	8	48·4	39·0	39·7	86	93·3	22·6	2·75	14	8·2
Malta	63·0	22*a*	43·2	19	60·8	50·8	48·5	75	136·5	...	·49	4	5·5
Mauritius	86·3	15	71·0	24	83·9	75·0	70·7	77	135·4	64·0	3·14	19	7·2
Calcutta	91·6	25	53·2	19	82·6	63·8	58·2	63	144·5	43·8	1·59	3	3·0
Bombay	83·6	17	63·3	28	81·4	68·1	63·8	69	131·5	51·8	·00	0	0·8
Ceylon, Colombo	90·4	13	70·8	5	88·6	75·0	72·3	78	146·0	68·8	1·68	11	4·7
Melbourne	95·6	18	48·9	22	74·3	57·3	55·3	72	143·0	39·5	2·97	13	6·0
Adelaide	107·3	10	52·9	26	86·3	64·5	53·7	48	163·9	42·5	1·80	8	5·1
Sydney	90·5	24	61·8	25	77·9	64·8	57·7	60	150·3	53·2	·46	7	3·7
Wellington	76·0	21	45·5	6	68·9	55·9	53·9	74	141·0	37·0	5·02	16	4·9
Auckland	82·0	2, 17	56·0	6	75·4	62·3	61·1	76	145·0	54·0	5·38	15	5·2
Jamaica, Kingston	92·3	26	65·8	14*b*	87·5	68·9	65·7	66	...	...	·00	0	2·5
Trinidad	90·0	5, 11	64·0	3, 4*b*	87·3	67·6	68·4	76	171·0	62·0	·75	11	...
Grenada	86·0	2	69·8	28	83·5	72·3	66·2	64	152·0	...	2·03	12	1·7
Toronto	44·0	17	1·0	26	30·8	18·2	21·2	81	58·2	—3·3	2·34	12	7·4
New Brunswick, Fredericton	42·9	7	—18·4	28	29·0	4·3	9·7	66	...	...	1·53	7	4·3
Manitoba, Winnipeg	32·2	4	—41·0	25	13·3	—11·4	...	...	...	...	·89	6	4·5
British Columbia, Esquimalt	50·6	26	28·2	21	45·4	35·5	37·3	89	...	...	3·63	19	8·1

a—and 23. *b*—and 15.

REMARKS.

MALTA.—Adopted mean temp. 55°·3, or 1°·5 above the average. Mean hourly velocity of wind 12·8 miles. TS on 9th. Mean temp. of sea 59°·1. J. F. DOBSON.

Mauritius.—Mean temp. of air 0°·6 above, of dew point 0°·7 above, and rainfall 3·84 in. below, their respective averages. Mean hourly velocity of wind 16·1 miles, or 4·6 above the average; extremes 29·3 on 22nd and 2·8 on 20th; prevailing direction E. by S. The driest February since 1876, excepting 1885, 2·16 in.; 1893, 2·42 in.; and 1895, 2·97 in. T and L on 20th. L on 27th. T. F. CLAXTON.

Adelaide.—Mean temp. 1°·7 above the average of 40 years; a very hot spell occurring from the 7th to the 18th, the temp. rising above 100° in the shade on 5 days, and over 90° on 10 consecutive days. C. TODD, F.R.S.

Sydney.—Mean temp. 0°·5 above, rainfall 4·91 in. below, and humidity 15 below, their respective averages. H. C. RUSSELL, F.R.S.

Wellington.—Fine in the early part, with a few light showers; from 9th to 16th wet, the max. rainfall (1·50 in.) being recorded on 13th; from 16th to 22nd, fine with moderate winds, chiefly northerly; remainder of the month showery and dull. Temp. 0°·1 below, and R 1·48 in. above, their respective averages. Slight double earthquake, shock at 9.4 p.m. on 27th. R. B. GORE.

Auckland.—A wet and disagreeable month, the rainfall being nearly two inches above the average. Heavy gale from N.E. on 11th and 12th, and again on 27th and 28th. T. F. CHEESEMAN.

TRINIDAD.—Rainfall ·94 in. below the average of 30 years. J. H. HART.

SUPPLEMENTARY TABLE OF RAINFALL, JULY, 1897.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
I.	Uxbridge (Harefield Pk.)	·61	XI.	Rhayader, Nantgwillt ...	3·15
II.	Dorking, Abinger Hall .	1·88	,,	Lake Vyrnwy	...
,,	Birchington, Thor	·51	,,	Corwen, Rhug	1·30
,,	Hailsham	·38	,,	Criccieth, Talarvor	1·51
,,	Ryde, Thornbrough	·75	,,	I. of Man, Douglas	1·56
,,	Emsworth, Redlands ...	·57	XII.	Stoneykirk, Ardwell Ho.	1·73
,,	Alton, Ashdell	·87	,,	New Galloway, Glenlee	2·46
III.	Oxford, Magdalen Col..	1·76	,,	Moniavie, Maxwelton Ho.	2·15
,,	Banbury, Bloxham	·52	,,	Lilliesleaf, Riddell	2·47
,,	Northampton, Sedgebrook	·30	XIII.	N. Esk Res. [Penicuick]	2·65
,,	Duddington [Stamford].	·13	XIV.	Glasgow, Queen's Park..	2·22
,,	Alconbury	·08	XV.	Inverary, Newtown	6·76
,,	Wisbech, Bank House...	·60	,,	Oban, The Corran	5·11
IV.	Southend	·82	,,	Islay, Gruinart School ...	1·00
,,	Harlow, Sheering..... ...	·75	XVI.	Dollar.....	1·73
,,	Colchester, Lexden	·47	,,	Balquhidder, Stronvar...	3·71
,,	Rendlesham Hall	·63	,,	Ballinluig	1·06
,,	Rushall Vicarage	1·22	,,	Dalnaspidal H.R.S.....	2·98
,,	Swaffham	·71	XVII.	Keith H.R.S.....	1·82
V.	Salisbury, Alderbury ...	·72	,,	Forres H.R.S.	·72
,,	Bishop's Cannings	1·30	XVIII.	Fearn, Lower Pitkerrie..	·55
,,	Blandford, Whatcombe .	·39	,,	N. Uist, Loch Maddy ...	3·69
,,	Ashburton, Holne Vic...	1·44	,,	Invergarry.....	1·24
,,	Okehampton, Oaklands.	1·89	,,	Aviemore H.R.S.	1·38
,,	Hartland Abbey	2·49	,,	Loch Ness, Drumnadrochit	2·22
,,	Lynmouth, Glenthorne.	1·82	XIX.	Invershin	1·83
,,	Probus, Lamellyn	2·38	,,	Scourie	...
,,	Wellington, The Avenue	1·33	,,	Watten H.R.S.....	1·51
,,	Wincanton.....	·69	XX.	Dunmanway, Coolkelure	2·58
VI.	Clifton, Pembroke Road	1·83	,,	Cork, Wellesley Terrace	1·19
,,	Ross, The Graig	...	,,	Killarney, Woodlawn ...	2·26
,,	Wem, Clive Vicarage ...	·61	,,	Caher, Duneske	1·33
,,	Cheadle, The Heath Ho.	·95	,,	Ballingarry, Hazelfort...	2·51
,,	Worcester, Diglis Lock	·54	,,	Limerick, Kilcornan ...	2·02
,,	Coventry, Priory Row ..	·25	,,	Broadford, Hurdlestown	3·39
VII.	Grantham, Stainby	·38	,,	Miltown Malbay	...
,,	Horncastle, Bucknall ...	1·26	XXI.	Gorey, Courtown House	1·69
,,	Worksop, Hodsck Priory	·57	,,	Athlone, Twyford	3·23
VIII.	Neston, Hinderton	·78	,,	Mullingar, Belvedere ...	2·57
,,	Southport, Hesketh Park	1·27	,,	Longford, Currygrane...	2·85
,,	Broughton-in-Furness ...	2·56	XXII.	Woodlawn	2·46
IX.	Ripon, Mickley.....	1·03	,,	Crossmolina, Enniscoe ..	3·73
,,	Melmerby, Baldersby ...	1·29	,,	Collooney, Markree Obs.	3·67
,,	Scarborough, Observat'y	·58	,,	Ballinamore, Lawderdale	3·34
,,	Middleton, Mickleton ...	1·55	XXIII.	Warrenpoint.....	1·67
X.	Haltwhistle, Unthank...	1·91	,,	Seaforde.....	1·33
,,	Bamburgh.....	2·05	,,	Belfast, Springfield	2·34
,,	Keswick, The Bank.....	2·49	,,	Bushmills, Dundarave..	2·33
XI.	Llanfrechfa Grange	2·21	,,	Stewartstown	2·49
,,	Llandovery	2·29	,,	Killybegs	4·52
,,	Castle Malgwyn	2·29	,,	Lough Swilly, Carrablagh	2·82
,,	Builth, Abergwesyn Vic.	3·33			

JULY, 1897.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1880-9.	Greatest Fall in 24 hours. Dpth	Date	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Max. Date	Min. Deg.	Min. Date.	No. of Night below 32°. In shade.	On grass.
			inches.	inches.	in.								
I.	ENGLAND.	London (Camden Square) ...	·64	— 2·04	·38	19	8	83·6	24	44·0	8	0	0
II.		Tenterden ...	·75	— 1·60	·42	19	7	81·0	17	44·0	8	0	...
,,		Strathfieldsaye ...	1·67	...	·56	26	4	...	...	...	...	...	...
III.		Hitchin ...	·80	— 1·92	·60	20	4	81·0	24*a*	40·0	7	0	...
,,		Winslow (Addington) ...	1·53	— 1·76	·73	21	6	81·0	30	38·0	8	0	0
IV.		Bury St. Edmunds (Westley)	·73	— 1·84	·54	20	4	76·0	24	47·0	8	0	...
,,		Norwich (Brundall) ...	·67	...	·21	24	7	85·0	24	42·1	8	0	0
V.		Weymouth(LangtonHerring)	·41	— 1·74	·18	19	7	78·0	31	46·0	8	0	...
,,		Torquay (Cary Green)	·88	...	·33	19	6	78·7	16	46·0	8	0	0
,,		Polapit Tamar [Launceston]..	3·68	+ ·27	1·77	20	12	...	...	...	...	...	...
VI.		Stroud (Upfield) ...	2·91	— ·66	2·00	20	10	83·0	16*b*	50·0	4	0	...
,,		ChurchStretton(Woolstaston)	·99	— 1·98	·45	25	8	80·5	16	44·5	7	0	...
,,		Tenbury (Orleton) ...	1·50	— 1·36	·50	19	10	86·5	16	37·7	8	0	1
VII.		Leicester (Rotherby Hall) ...	·42	...	·13	25	6	80·0	23*c*	35·0	8	0	1
,,		Boston ...	1·78	— 1·01	·67	26	7	82·0	30	40·0	8	0	...
,,		Hesley Hall [Tickhill]...	·52	— 2·15	·12	1	7	81·0	18*d*	40·0	11*e*	0	...
VIII.		Manchester(PlymouthGrove)	1·73	— 2·06	·60	26	12	83·0	18	45·0	6*f*	0	...
IX.		Wetherby (Ribston Hall) ...	·46	— 2·72	·19	25	7	...	...	...	...	...	...
,,		Skipton (Arncliffe) ...	2·74	— 2·90	·62	7	13	...	...	...	...	...	...
,,		Hull (Pearson Park).	·40	— 2·19	·22	25	7	80·0	23	40·0	11	0	...
X.		Newcastle (Town Moor) ...	1·39	— 2·13	·88	20	10	...	...	...	...	...	...
,,		Borrowdale (Seathwaite)...	7·88	— 3·11	2·57	8	14	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely)...	1·41	— 2·65	·54	19	11	...	...	...	...	...	...
,,		Haverfordwest	3·00	— 1·21	·83	19	14	81·0	16	41·0	8	0	0
,,		Aberystwith (Gogerddan) ...	2·88	...	1·15	18	11	84·0	15	37·0	10	0	...
,,		Llandudno... ...	·87	— 2·13	·21	8	7	76·5	31	47·6	11	0	...
XII.		Cargen [Dumfries]	1·60	— 2·33	·36	20	9	81·6	15	40·6	11	0	0
XIII.		Edinburgh (Blacket Place)...	1·82	...	·71	20	10	81·0	15	43·3	8	0	...
XIV.		Colmonell	1·89	...	·40	8	10	80·0	31	35·0	10	0	...
XV.		Lochgilphead (Kilmory) ...	3·61	— ·69	·58	28	14	...	...	39·0	10	0	...
,,		Mull (Quinish)...	4·99	+ ·94	1·04	23	14	...	...	...	...	...	...
XVI.		Loch Leven Sluices ...	1·80	— 1·82	·30	9	10	...	...	...	...	...	...
,,		Dundee (Eastern Necropolis)	2·25	— 1·21	1·60	24	10	82·1	15	41·9	8	0	...
XVII.		Braemar	1·76	— 1·45	·95	24	13	77·7	15	35·4	11	0	3
,,		Aberdeen (Cranford)	1·74	...	·83	24	14	74·0	23*d*	35·0	7	0	...
,,		Cawdor (Budgate) ...	1·04	— 2·26	·18	6, 27	13	...	...	...	...	...	...
XVIII		Strathconan [Beauly] ...	4·30	+ ·80	1·54	5	11	...	...	...	...	...	...
,,		Glencarron Lodge...	7·55	...	1·47	6	16	79·9	15	39·6	11	0	...
XIX.		Dunrobin ...	1·03	— 1·82	·28	25	9	77·8	15	41·0	8	0	...
,,		S. Ronaldsay (Roeberry)...	1·58	— ·78	·42	5	13	74·0	24	44·0	6, 7	0	...
XX.		Darrynane Abbey...	1·88	...	·42	24	18	...	...	...	...	...	...
,,		Waterford (Brook Lodge) ...	1·97	— 1·56	·82	19	16	77·0	16	39·5	8	0	...
,,		O'Briensbridge (Ross) ...	3·39	...	·57	23	14	...	...	...	...	...	...
XXI.		Carlow (Browne's Hill) ...	1·53	— 1·99	·39	19	12	...	..	...	...	...	...
,,		Dublin (FitzWilliam Square)	1·65	— 1·03	·29	26	12	75·1	23	46·1	11	0	0
XXII.		Ballinasloe	2·47	— 1·08	·50	23	16	75·0	31	45·0	7	0	...
,,		Clifden (Kylemore) ...	4·77	...	1·34	26	16	...	...	...	...	.	...
XXIII		Waringstown ...	1·37	— 2·15	·55	24	9	85·0	16	42·0	12	0	0
,,		Londonderry (Creggan Res.).	2·19	— 1·93	·44	24	15	...	...	...	...	...	...
,,		Omagh (Edenfel) ...	3·59	— ·13	1·70	24	14	80·0	15	43·0	7	0	...

+Shows that the fall was above the average ; —that it was below it.

a—and 30. *b*—and 18. *c*—and 24, 30. *d*—and 24. *e*—and 12. *f*—and 7, 10.

METEOROLOGICAL NOTES ON JULY, 1897.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail S for Snow.

ENGLAND.

TENTERDEN.—A dry, hot month, grass very much burnt up, flowers and fruit also felt the effect of east winds and scorching sun, only on one day was the temp. in shade above 80°, against five in 1896. Duration of sunshine almost exactly the same, 249 hours. Other gauges in the district received much less R in the TS of 19th. Sharp TS on 21st. Slight TS on 27th. Fog on 17th and 23rd.

ADDINGTON.—A very fine month, grand weather for haymaking. From 28th June until 19th July, only one little shower fell. The storms on the 20th and 21st were very local. On the 20th, four miles S.E., hay was being carried all the time it rained here, and five miles W. there was just a sprinkling. The TS of the 21st was very sharp. In an adjoining parish some workmen had a narrow escape, a cow being killed under a tree a few yards from where they were standing; a sheep was also killed in Claydon parish. The night of the 8th was cold for July, the thermometer on the grass falling to 35°.

BURY ST. EDMUNDS, WESTLEY.—A very dry, hot month, with much sunshine. Wheat cutting began on the 26th. Barley much injured by want of rain. Heavy TS on 20th. TS on 21st; distant T on 22nd.

NORWICH, BRUNDALL.—Mean temp. 0°·8 lower than the previous July, and rainfall 2·22 in. below the average. T and L on 20th and 26th. T on 21st.

WEYMOUTH, LANGTON HERRING.—With the exception of July, 1885, when only ·25 in. of R fell, the driest July in 23 years. The mean temp at 9 a.m., 64°·8, is 2° above the average. The mean max., 71°·7, has been exceeded only once in 26 years, in 1878, when it was 72°·6. A very fine month; oats carried under favourable conditions. T on the 18th; fog on the 23rd.

TORQUAY, CARY GREEN.—Rainfall 1·85 in. below the average. Mean temp. 63°·0 or 1°·7 above the average. Duration of sunshine 246 hours 25 minutes, being 56 hours 25 minutes above the average; one sunless day.

POLAPIT TAMAR [LAUNCESTON].—A severe TS, with frequent vivid L, heavy T, and torrents of R shortly before 1 p.m. on the 20th. After 45 minutes ·84 in. was measured, and in all probability ·80 in. fell in 30 minutes. In 2 hours 20 minutes 1·29 in. had fallen, and at 8.30 p.m., or in 7 hrs. 30 min., a total of 1·62 in. was registered.

STROUD, UPFIELD—TSS on 20th, 25th and 26th.

WOOLSTASTON.—Very hot and very dry, little R till the 24th and 25th, when there were repeated short violent storms. Mean temp. 61°·5.

TENBURY, ORLETON.—A very fine, hot month, with a large percentage of bright sunshine. The temp. rose above 70° on 21 days, and above 80° on 6 days. Very little T was heard, and no L seen during the month.

ROTHERBY HALL.—Though July was generally hot and dry, the rainfall here is still 1·60 in. in excess of that for the first seven months of 1896. On the 8th the thermometer on the grass fell to 32°, which is the lowest on record here for July. The mean shade temp. was 59°. T on 21st, 25th, and 26th.

BOSTON.—On the 21st a heavy thundershower occurred, the R being partial. In the town 1·36 in. was registered, others recorded 1·26 and 1·80, and at the Witham Grand Sluice 2·17 in. At Kirton, 4 miles away, no rain fell.

MANCHESTER, PLYMOUTH GROVE.—Unsettled up to the 9th, then fine, summer weather, from 10th to 22nd, and on 30th and 31st. T and L on 5th, TS on 25th. Mean temp. 61°·5.

SKIPTON, ARNCLIFFE.—A dry month.

WALES.

HAVERFORDWEST.—The magnificent weather of June was prolonged, with the exception of small falls of R on 6th and 7th, up to the 18th, and one of the

finest hay harvests known for many years was saved in grand weather. A sudden change took place on the 18th, and R came just in time to save green crops from the devastation of the fly, and the crops generally from failure owing to excessive high temp. and drought. Max. in sun, 132°·8 on 16th. Fruit crops a total failure. Prevailing wind S.S.E., N.N.W. and S.E. The night temperatures were unusually high. On 19th and 20th, 1·66 in. of R fell in 36 hours.

ABERYSTWITH, GOGERDDAN.—A very hot, dry month, with a few TSS.

SCOTLAND.

CARGEN [DUMFRIES].—The climatic conditions of the month were the most favourable experienced for many years. Temp. and sunshine approximate very closely to the returns for the Jubilee year 1887, the mean temp. during the month (60°·3) of that year being 0°·4 higher than that just recorded; no higher mean temp. for July has been recorded during the intervening years. It is worthy of remark, that in the "seventies" the mean temp. of this month exceeded 60° five times; in the "eighties" only once; while in the "nineties," so far, that figure has not yet been reached. The hours of sunshine are two more than recorded in 1887, and have only once (in 1878) been exceeded during the last 38 years. The rainfall for the month is the least recorded since 1878, and is about one-half of the average. Light easterly winds have been most prevalent. The weather was exceptionally favourable for farm work. Rye grass hay was secured in splendid condition, and good progress was made with an unusually heavy crop of meadow hay. Harvest will be about three weeks later than last year, and will not be general before the latter end of August; an abundant yield of both grain and straw is anticipated. T on 24th and 27th.

EDINBURGH, BLACKET PLACE.—The feature of the month was the very large amount of bright sunshine, 232 hours being recorded. Fog at night on 13th, TSS on 24th, and T on 25th.

COLMONELL.—R 1·74 in. less than, and mean temp. 2°·1 above, the average of 21 years.

BRAEMAR.—An excellent, forward, growing month.

ABERDEEN, CRANFORD.—A heavy TS on the 24th.

S. RONALDSAY, ROEBERRY.—A fine month upon the whole, with the exception of two cold snaps. Mean temp. 55°·7, or 1°·1 above the average of seven years. A slight TS on morning of 25th.

IRELAND.

DARRYNANE ABBEY.—A foggy, misty month, very warm at the end. T between midnight and 1 a.m. on 24th.

WATERFORD, BROOK LODGE.—Broken weather, with spells of east wind and a good deal of fog at night. Heavy T on 20th.

O'BRIENSBRIDGE, ROSS.—Bright from 8th to 16th; close and sultry without sunshine for most part of the latter half. The last two days very warm.

DUBLIN, FITZ WILLIAM SQUARE.—A very favourable month, with sufficient R and of average temp. Mean temp. 61°·1, or 0°·5 above the average. Temp. reached or exceeded 70° in the screen on 7 days. In July, 1887, the temp. reached or exceeded 70° in the screen on no fewer than 17 days; while in 1888, the maximum for July was only 68°·7. TS on the evening of the 21st. Solar halo on the 4th. H on the 6th and 26th. Foggy on the 16th, 21st and 31st.

WARINGSTOWN.—Splendid weather all the month; the best hay harvest remembered; all crops good.

EDENFEL.—After the abnormal and persistent R and unsettled weather of June, July has been somewhat in the nature of a pleasant surprise. After the first week a complete—and what has turned out a permanent—change for the better took place, and with considerable sunshine, warmth and but occasional torrential showers, all crops now afford the promise of great abundance.